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## **General considerations on endemic treponematoses in the rural Sahel region of Upper Volta**

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### **Summary**

A sero-immunological survey conducted by indirect immunofluorescence technique has made it possible to determine accurately the prevalence and distribution of treponematoses in the Sahel rural region of Upper Volta. The number of carriers of antitreponemal antibodies varies from one place to another, but is particularly high in a nomad community, where prevalence attains 84.2%. The magnitude of endemic foci can also be expressed in terms of maximal titer and geometric mean of antibody titers. The seropositive values increase as a function of age, but sex is not a significant factor as regards prevalence, which would appear to depend essentially on the way of life, habits and promiscuity.

**Key words:** epidemiology; treponematoses; rural Upper Volta.

### **Introduction**

Endemic syphilis or Bejel belongs to the non venereal group of treponematoses and is found in West Africa in the arid Sahel and Sudan regions (Boiron et al., 1965; Basset et al., 1969; Cirera et al., 1971; Fasquelle, 1971; Basset et al., 1972; Ridet et al., 1979). At the present time, it is still illusory to claim that Bejel is distinguishable from venereal syphilis by the morphology of the causative

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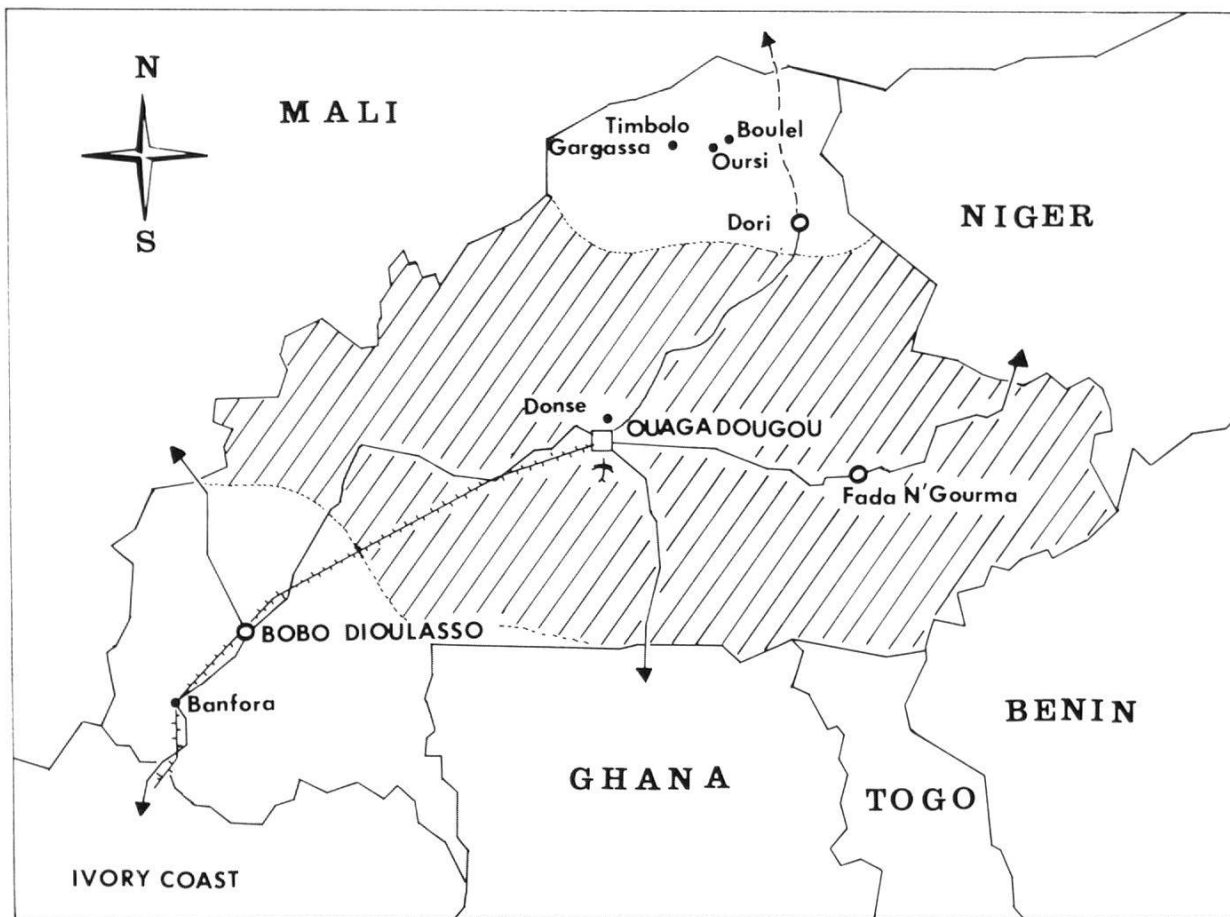


Fig. 1. Centres of the survey.

treponema, inoculation of the animal or sero-immunological tests. In practice, therefore, serologic surveys appeared to be conducted to determine the global prevalence of treponematoses. It seems reasonable to propose that only their specific clinical manifestations and a knowledge of certain biotopes make it possible to predict their identification. Thus in the Sahel region in the North of Upper Volta, where we conducted our survey, endemic syphilis occurs as a major problem of Public Health which requires urgent consideration.

### Material and Methods

The survey was conducted in two climatic zones of Upper Volta; in the Sahel region, in the department of Oudalan, at Oursi, Boulel and Timbolo-Gargassa; in the Sudan region, in the department of Ziniaré, at Donse (Fig. 1).

The 597 inhabitants of Oursi – Songhraïs farmers and their families – and the 246 Rimaïbés of Boulel, all sedentary, live in dried mud huts, near water supply points.

Timbolo-Gargassa has a population of 180 Bellahs who are somewhat related to the Warag-warag Touaregs. Their way of life is still of a nomad character. Hemispherical, transportable straw huts serve as dwellings. A well 10 km away constitutes the village water supply.

At Donse, situated in the heart of the Mossi country, alongside a man-made lake, the sedentary population (577 inhabitants) lives in separate concessions, composed of dried mud huts.

Table 1. Prevalence, geometric means and maximum titers of antitreponemal antibodies in the four villages of Upper Volta

Village	Ethnies	Prevalence (%)	Antibody titers (geom. means)	Max. titers
Oursi .....	Songhrai	12.6 (373)*	1/1312	1/218,700
Boulel .....	Rimaïbé	42.6 (144)	1/9395	1/656,100
Timbolo-Gargassa .....	Bellah	84.2 (118)	1/50,200	1/984,150
Donsé .....	Mossi	3.4 (260)	1/716	1/1800

\* Subjects number

Due to certain obligations, such as farming requirements, the tending of herds, travelling, lack of interest on the part of the population, the survey covered a global population of 895 subjects including 373 at Oursi, 144 at Boulel, 118 at Timbolo-Gargassa and 260 at Donsé.

A medical examination investigating signs suggestive of venereal and endemic syphilis preceded the blood sampling campaign.

An indirect immunofluorescence technique, involving an antigen prepared in the laboratory was used to detect antitreponemal antibodies. The protocol for sera absorption on ultrasonate of Reiter's treponema and for the reaction have already been mentioned (Bourdillon et al., 1981). In our study, the positive range extended from 150 to 108,000. Only the titers above or equal to 150 are considered positive.

## Results

The results of the serologic survey were expressed according to villages, ethnic groups, sex, serologic positivity and local habits.

Each village has a different ethnic population: Mossi at Donsé, Songhrai at Oursi, Rimaïbé at Boulel, Bellah at Timbolo-Gargassa. The prevalence of treponematoses for each village thus corresponds to the ethnic distribution (Table 1). The number of carriers of antitreponemal antibodies varies from one place to another: exceptionally high in the nomad community of Timbolo-Gargassa, in the Sahel region (84.2%), and low among the sedentary Mossi population of Donsé, in the Sudan area (3.3%). The magnitude of endemic foci can also be expressed in terms of maximum titer and geometric mean of antibody titers. Once again, it is at Timbolo-Gargassa, that the highest figures are recorded (Table 1).

The seropositive values evolve according to age (Fig. 2). At Donsé, 9 positive serologies were found between 10 and 30 years of age. At Oursi, prevalence was low up to 9 years of age, progressively increasing to reach a maximum after 40 years of age. The distribution curve of Boulel, for a long time stationary, mainly rose between 20 and 39 years of age; the prevalence was 72.5% after 40 years of age. At Timbolo-Gargassa, it was outstanding at the age of three (66.6%) reaching their heights soon after adolescence (97%). It is at this period of life that the highest antitreponemal antibody levels are to be found (Fig. 3).

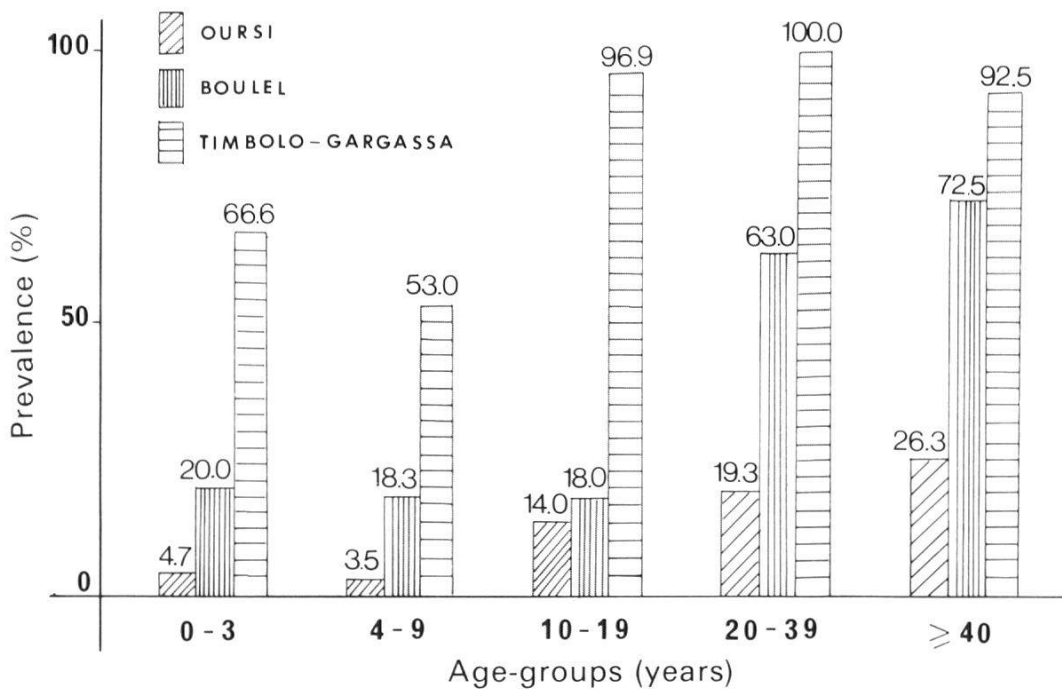


Fig. 2. Prevalence of carriers of antitreponemal antibodies in different age-groups and centres (numbers tested)

Village	Age-groups (years)				
	0-3	4-9	10-19	20-39	≥40
Oursi .....	49	86	120	80	38
Boulel .....	14	29	39	32	30
Timbolo-Gargassa .....	18	23	30	29	18

By a  $\chi^2$  test and taking into account the overall population studied as well as the village populations, it could be demonstrated that sex was not a significant factor ( $p > 0.05$ ) as regards prevalence.

## Discussion

The results of this study prompt a certain number of questions concerning the presence of various treponematoses in the Sahel region and their modes of contamination.

What interpretation can be given to positive immunofluorescence results, considering our sero-immunological method of detection has proved incapable of differentiating among the treponematoses?

In our survey, congenital syphilis appeared to be rare: only one serology proved positive in the 0-1 year age-group; it concerned a 6-month-old child of Timbolo-Gargassa. The possibility of a venereal or even non venereal transmission of syphilis, due especially to poor family hygiene and promiscuity, must be

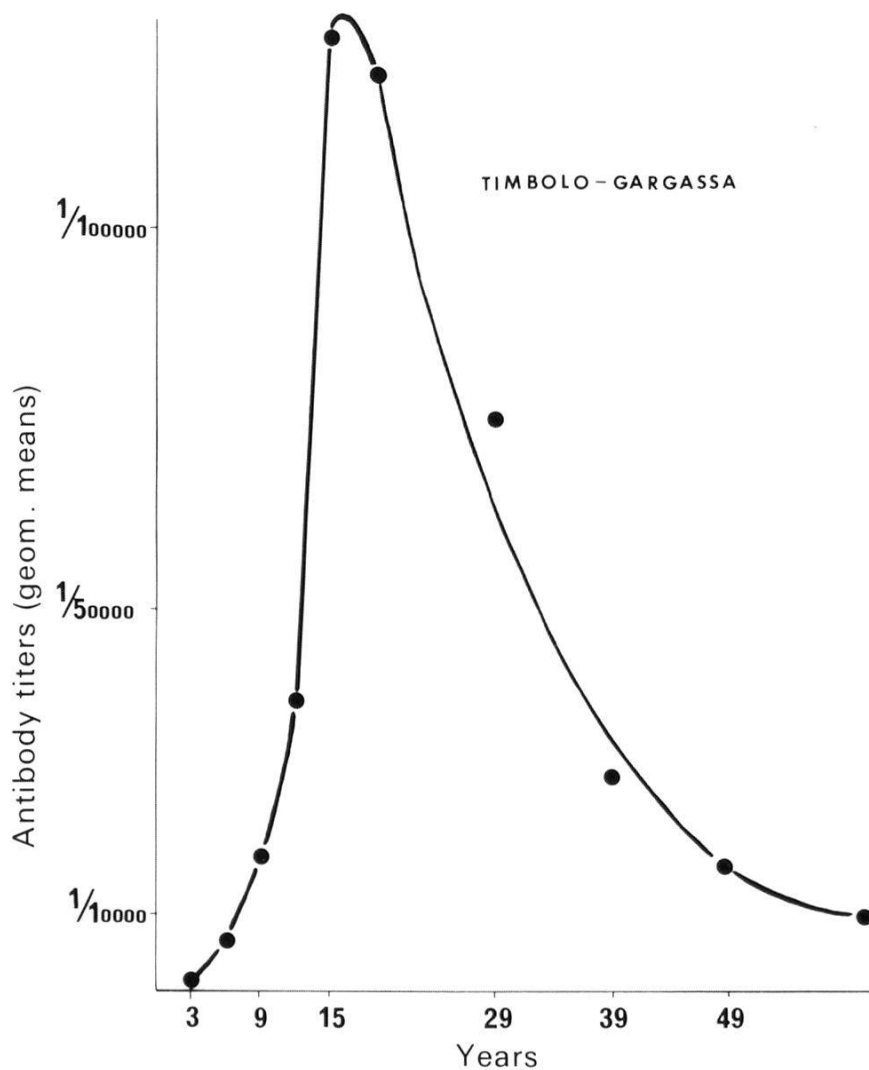


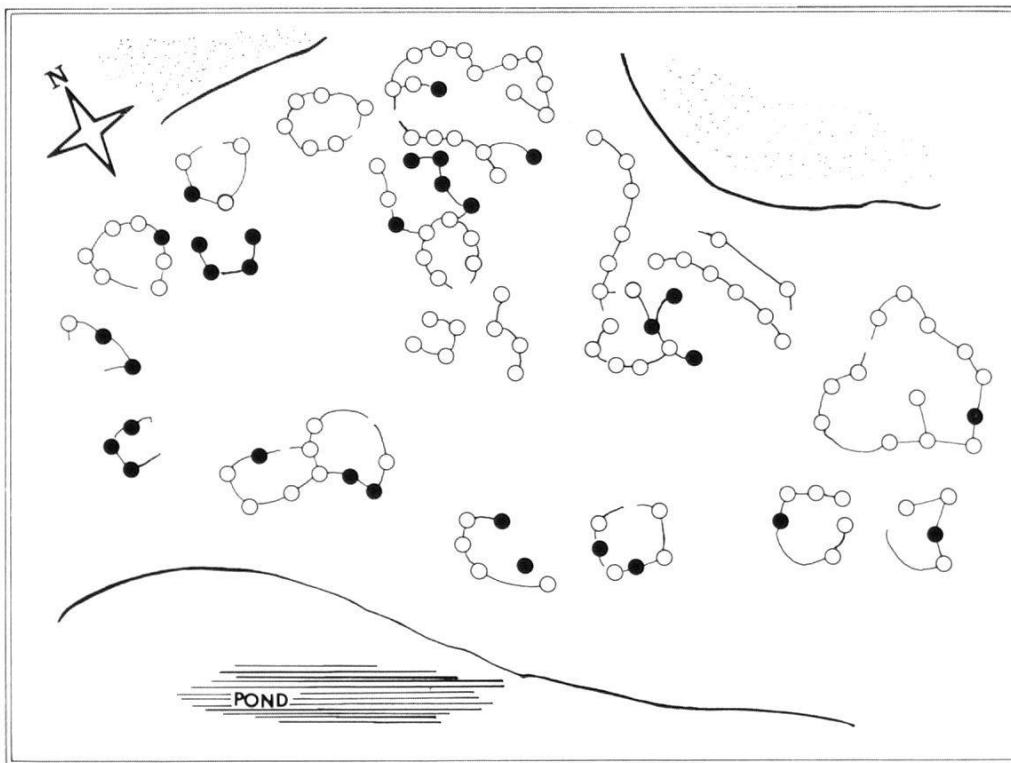
Fig. 3. Antibody titers (geom. means) in relation to age at Timbolo-Gargassa.

considered with caution, because visible clinical manifestations of syphilis were absent. It must be realized, however, that discretion constitutes a barrier to research into specific lesions during mass survey.

Henceforth, the presence of venereal syphilis can only be based on presumptive evidence, in particular the sharp accumulation of cases after puberty, especially in nomad societies where the customs enjoyed are extremely liberal.

Although yaws has been described in Upper Volta (WHO, 1982), our survey has not revealed its existence, on the arid region, in the northern country. However, it remains to discuss five positive serums from adults 24–28 years old, who work currently in Ivory Coast; nevertheless they do not present clinical manifestations in favour of this affection.

Bejel lesions (mucous patches on the buccal mucosa, angular stomatitis, circinate syphilides) discovered among the inhabitants of the three villages of Oudalan, confirm the perennial character of the endemy since 1971 (Fasquelle, 1971). At Oursi and Boulel, 4 and 20% of the subjects presenting a positive



● Treponematoses foci      ○ Dwelling-houses

Fig. 4. Topography study of treponematoses at Oursi.

serology developed progressive lesions. At Timbolo-Gargassa, the proportion was 39.2%. Conversely, in the Sudan region, at Donsé, no definite element of diagnosis could confirm the authenticity of Bejel.

This compared survey confirms that endemic syphilis is essentially rife in the dry and semi-desert regions; nevertheless, local variations may prove considerable; villages not more than 15 km distant have prevalences varying in the proportion of 1 to 7 (12.6% at Oursi, 84.2% at Timbolo-Gargassa).

In addition to climatic conditions, other factors appear to be involved in the perennity and dissemination of the treponemal infection, namely the way of life, habits and promiscuity.

At Oursi, where the prevalence is low (12.6%), the Songhrai population has long been sedentary; each family consumes the produce of its own harvest and draws its water supply from the neighbouring pond. Few exchanges take place within the community. At Boulel, the Rimaïbés have recently become sedentary; the sharing of food, especially of water drawn from the well or temporary marigot is more frequent. The prevalence attains 42.6%.

The Bellahs encountered at Timbolo-Gargassa have remained nomads; their nutritional problems appear to be solved, but their sole water supply is to be found at about 10 km away from the village. Waterskins are installed at the entrance; anyone can come and drink from them and cause collective contami-

nation, if affected by buccal syphilitic lesions. Since such a custom was liable to affect prevalence (84.2%); it was abandoned by a community of sedentary Bellahs from a neighbouring community: Gountouré-Oursi, next to water supply points, and prevalence did not exceed 38%.

The scope of promiscuity is revealed by the topographical study of the village of Oursi (Fig. 4). Macrofoci of treponematoses constituted by several groups of contiguous dwelling-places can be distinguished from rare microfoci limited to a single dwelling. In the macrofoci, family and neighbourhood contamination can occur by direct or indirect interhuman contact, by the use of domestic utensils passing from mouth to mouth. The microfocus is represented by a single person, generally a child suffering from treponematoses, in whose case infection is always possible during games which assemble the youth from various districts.

Frequent among the sedentary population, the promiscuity is much greater among the nomads, due to the fragile, confined and poorly isolated character of their dwellings. Crowding affords poor protection against the cold during winter nights but favors the transmission of interhuman infections.

Such epidemiological conditions constitute a whole set of factors favorable to the dissemination of treponematoses which should be considered priority diseases in the Sahel region. The results of indirect immunofluorescence, a technique which has good specificity and is highly sensitive, in particular 200 times more than VDRL (Fribourg-Blanc, 1971) demonstrates the urgency required in applying mass therapy in rural areas. Prevalences of 72 and 100% of treponematoses in the villages must necessarily force attention.

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